

LOWELL REGIONAL WASTEWATER UTILITY POLYMER SELECTION SPECIFICATIONS

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. The vendor shall supply bulk liquid polymer to the Lowell Regional Wastewater Utility (LRWWU) at the Duck Island Wastewater Treatment Facility (WWTF) in accordance with this specification for a period from December 15, 2013 through June 30, 2016. The unit price(s) for the polymer specified below shall be fixed for the term of the contract.
- B. The polymer vendor shall supply a single polymer that is appropriate for both the following sludge processes:

Segregated Sludge Thickening and Dewatering – One polymer shall be used for mechanical Waste Activated Sludge (WAS) thickening and dewatering of blended sludge.

- i. **WAS Thickening** – A Rotary Drum Thickener (RDT) is used to mechanically thicken the WAS. The WAS is dosed with polymer in a mixing tank before entering the RDT process. Jar testing is required to determine the optimal WAS Thickening Polymer and dosing for this polymer. Prior to mechanical thickening, the WAS is typically one half (0.5) to one (1) percent solids. The desired solids percentage for mechanical thickening of WAS, with polymer addition, is three (3) to six (6) percent.
 - ii. **Sludge Dewatering** – Thickened Waste Activate Sludge (TWAS), Septage, and Thickened Primary Sludge (TPS) are being blended inline and dosed with polymer inline before being conveyed to the dewatering equipment, decanter centrifuge with a 29-inch bowl. Prior to dewatering, the typical solids percentage of the sludge, with polymer addition, is three (3) to six (6) percent. The desired solids percentage for dewatered sludge, with polymer addition, is twenty (25) to thirty (30) percent.
- C. All bulk liquid polymer is blended with water using a Fluid Dynamic's dynaBlend L6S-3000-15p-I3-3-TFS Polymer Make Down System.
- D. In order to determine the best polymer for use at LRWWU's Duck Island WWTF, prospective polymer vendors will need to perform jar testing prior to bidding. Sludge samples will be available upon request. Prospective polymer vendors must coordinate with LRWWU to collect the necessary sludge samples; onsite jar testing is permitted.

1.02 SUBMITTALS

- A. The bid shall include:
 - 1. The polymer name to be for both processes, mechanical thickening of WAS and dewatering of blended sludge.

2. The polymer technical data sheet(s) and Material Safety and Data Sheet(s)
 3. Estimate of polymer dosage in terms of wet pounds of active polymer per dry ton of sludge processed
 4. Estimate of polymer cost per dry ton of sludge processed
 5. The unit price per gallon for the polymer
 6. Total estimated contract cost
- B. The jar testing results shall be provided with each polymer bid.
- C. The bid shall contain Table No.1 filled in with the polymer name and information based on the jar testing.

TABLE No.1

TYPE OF POLYMER REQUIRED	FEED SLUDGE	POLYMER NAME AND PERCENT ACTIVE AS DELIVERED	ESTIMATED MAXIMUM POLYMER USAGE (LBS ACTIVE/DRY TON OF SLUDGE)	POLYMER UNIT PRICE (\$/GALLON POLYMER)	POLYMER UNIT PRICE (\$/LB ACTIVE POLYMER)
<u>Bulk Liquid</u> One polymer for thickening WAS and dewatering blended sludge as noted in Section 1.01	WAS Thickening Sludge Feed (0.5 ~ 1.0 % solids)				
	Dewatering Centrifuge Sludge Feed (4.0 ~ 6.0 % solids)				

1.03 AWARD

- A. The Contract award shall be made thirty (30) days after the bid opening. Jar testing shall be necessary to determine the polymer dose required. The polymer vendor shall use Table No.2 to estimate the contract total.
- B. The total estimated contract cost must include the shipping and supplying of liquid polymer delivered in bulk to the Duck island WWTF.
- C. The Contract award shall be based on the lowest Total Estimated Contract Cost as computed in Table No.2. The Bidder shall fill in the Polymer Unit Price Column based on the polymer being proposed. The Weighted Price for each polymer shall be computed by multiplying the Contract Period (days) by the Estimated Sludge Quantity (Dry Tons/Day) and by the Estimated Maximum Polymer Usage (lbs Active Polymer/Dry Ton of Sludge) by the Polymer Unit Price Column (\$/lb Active Polymer). Each individual Weighted Price must be entered.

Example:

$$563 \text{ days} \times 24.50 \text{ Dry Tons/Day} \times 25 \text{ lbs Active Polymer/Dry Ton Sludge} \times \$2.00/\text{lb Active Polymer} = \$689,675$$

The total of all Weighted Prices shall be entered in the bottom space as the Total Estimated Contract Cost.

TABLE No.2

TYPE OF POLYMER REQUIRED	CONTRACT PERIOD	ESTIMATED SLUDGE QUANTITY (DRY TONS/DAY)	ESTIMATED MAXIMUM POLYMER USAGE (LBS ACTIVE/DRY TON OF SLUDGE)*	POLYMER UNIT PRICE (\$/LB ACTIVE POLYMER)	WEIGHTED PRICE (\$)
<div>Bulk Liquid</div> <div>One polymer for thickening WAS and dewatering blended sludge as noted in Section1.01</div>	<div>December 15, 2013 – June 30, 2015</div> <div>(563 Days)</div>	<div>WAS</div> <div>9 dry tons / day</div> <div>(0.5 ~ 1.0 % solids)</div>			
		<div>Dewatering Centrifuge Sludge Feed</div> <div>24.5 dry tons / Day</div> <div>(4.0 ~ 6.0 % solids)</div>			
	<div>July 1, 2015 – June 30, 2016</div> <div>(366 Days)</div>	<div>WAS</div> <div>9 dry tons / day</div> <div>(0.5 ~ 1.0 % solids)</div>			
		<div>Dewatering Centrifuge Sludge Feed</div> <div>24.5 dry tons / Day</div> <div>(4.0 ~ 6.0 % solids)</div>			
TOTAL ESTIMATED CONTRACT COST =					\$

* Estimated Maximum Polymer Usage shall be in accordance with jar testing results reported in Table No.1.

- D. The selected bidder shall conduct a full-scale trial for one (1) day at no cost to LRWWU. Failure to meet the Estimated Maximum Polymer Usage specified in the contract price during the trial shall be cause for rejection of the proposal. In the event that this occurs, the next highest-rated bidder shall be offered the opportunity to run a full-scale trial and earn a contract award.
- E. LRWWU shall be the sole judge in determining the acceptance of polymers for full-scale use at the Duck Island WWTF.

1.04 QUALITY ASSURANCE

- A. The polymer type submitted in the bid shall be of the same quality and grade and be representative of the polymer that will be supplied by the manufacturer for full-scale use.
- B. LRWWU will collect a sample from each load delivered. If it is determined, through either chemical analysis or jar testing, that a delivered polymer is inferior to the sample supplied during bidding and/or the full-scale trial, then the manufacturer shall remove the inferior polymer and supply an equal quantity of new polymer at no cost to LRWWU. The manufacturer will also be required to reimburse LRWWU for any added expense incurred by the Utility for having used an inferior product.

1.05 PRODUCTS

- A. The vendor will be solely responsible for the quality of the polymer supplied to LRWWU.
- B. The polymer supplied must be compatible with LRWWU's automatic feed equipment.
- C. The exact polymer quantity of the contract is not known. The specification attempts to give an accurate estimate of the probable quantity to be purchased during the contract period. This specification does not guarantee that LRWWU or the City of Lowell will buy any or all estimated amounts of polymer or any total amount. City requirements that exceed normal usage quantities may be exempt from this contract and purchased separately exercising normal purchasing practices and competitive bidding.

PART 2 - EXECUTION

2.01 DELIVERIES

- A. LRWWU will place polymer orders as needed. LRWWU's Duck Island WWTF has two (2) 3,000-gallon storage tanks for accepting bulk polymer deliveries. Tanker trucks will need to have a minimum of 40 feet of hose for off-loading and must be able to pressure off-load the contents of the truck.
- B. The polymer vendor must deliver the requested amount of polymer within a maximum of two (2) weeks of an order being placed.
- C. The polymer delivery driver will be responsible for cleaning the unloading area after deliveries.
- D. The polymer delivery driver must communicate the volume to be delivered to LRWWU personnel prior to off-loading in order to prevent the Bulk Polymer Storage Tanks from being overfilled.